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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



Fatherless Gobbler

See Page 291

A SCIENCE SERVICE PUBLICATION

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GENERAL SCIENCE

U. S. Needs Basic Science

The National Science Foundation warns that basic scientific research must be encouraged and expanded and that the Federal Government must be active in its support.

► IN COLD, blunt language the National Science Foundation has warned the American Government and people that they must understand, accept and promote basic science or face a bleak future.

In an unprecedented plea in defense of basic scientific research, the Foundation says its 64-page report presents "the case for basic research as an activity so indispensable to the Nation that the Federal Government cannot avoid responsibility for its encouragement and support." (See p. 300.)

In anticipation of the report's impact, the Foundation's director, Dr. Alan T. Waterman, said: "The Foundation recognizes that some of the issues raised by this study may bring out differences of opinion. Many affect public policy, however, and should therefore be discussed in public forums. Differences can be resolved when the issues involved are clearly understood."

The report charges that the "picture most of us have" of the basic research is "distorted." This distortion has been corrected somewhat in the last decade and support for basic research from both Government and industry has increased appreciably.

"But," the report warns, "the increase is still not enough to keep pace with the nation's requirements."

The central purpose of the report, the Foundation says, is to focus on "the very real need to foster, by increased financial support and all other methods, a national atmosphere in which basic research may continue to flourish." This, the Foundation adds, is very close to another national problem—the shortage of scientists and engineers.

To achieve the proper climate for basic research in the United States, the Foundation emphasizes two main steps to be taken.

The first is to establish conditions more favorable to the continued growth of basic research, and the second is to achieve a greater flow of funds for basic research.

This can be done in eight ways, the Foundation states:

1. By industries increasing their financial aid to basic research, especially in the form of more unrestricted funds to universities and other nonprofit institutions, as well as more basic research in their own laboratories.

2. By a sensitive management of private industry that sees lack of knowledge as a roadblock to its progress.

3. By encouragement to "industrially oriented" institutes, foundations, professional societies and other nonprofit organizations.

4. By encouraging state governments, with appropriate Federal assistance, to increase their support of basic research.

5. By setting up incentives to increase philanthropic giving to basic research and

even changing existing laws to help giving, "particularly in the Federal internal revenue laws."

6. By reducing the amount of development work for Government agencies now being done under contract by universities and colleges, and increasing the amount of basic research instead.

7. By recognizing the requirement that Federal grants for research and research training should carry a minimum of restrictions on the freedom of the scientist and the administration of his institution.

8. By developing closer relations and better understanding between members of Congress and scientists, in view of the responsibility of the representatives of the



THREE STRIKES—The 300-foot water plume of a conventional depth charge, resulting during routine underwater explosion experiments conducted by the U.S. Naval Ordnance Laboratory, induced a cloud to discharge its electrical energy. The three consecutive lightning bolts, following the same path and all striking the plume within one second, were photographed with high-speed cameras. Great care is exercised by the Navy in handling explosives and atmospheric conditions were clear when the depth charge was placed in the water. NOL scientists reported no indication of storm or electrical activity.

people to make important decisions involving some understanding of science.

The report points to examples of promising research resulting from what it terms "unpredictable" basic research: radio astronomy, virus heredity and translation by electronics.

It also touches upon basic research in Russia:

"It would appear that the United States has a formidable competitor in the Soviet Union which, although starting from a relatively low research-and-development level, is progressing at a remarkably rapid rate."

Summarizing our own present situation, the Foundation says that, "much progress has been made, but basic research is still under-emphasized in the United States."

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BIOLOGY

Vaccination Increases Parthenogenesis Chances

See Front Cover

► FATHERLESS turkeys may become less rare, only a few having been hatched in years in research, if turkey hens are vaccinated.

Nonmated turkeys and chickens are more likely to produce "spontaneous embryos" after they have had a fowl pox vaccination, scientists have reported.

It is not yet clear if the "activating agent" is the vaccine itself or a contaminant it may contain. Whichever it is, it has caused about a six percent increase in the number of eggs showing spontaneous embryos.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the bird believed to be the oldest surviving parthenogenic poult. Weighing about 12 pounds, the young turkey was 161 days old at the time the picture was taken in early September.

Dr. M. W. Olsen, poultry scientist at the U. S. Department of Agriculture's Research Center, Beltsville, Md., believes genetics is still the important contributor to the phenomenon of parthenogenesis.

Poultry's tendency toward parthenogenesis, the spontaneous development of embryonic tissue in an infertile egg, can be increased or decreased by selective breeding. A combination of vaccine "activating agent" and a susceptible strain of birds does, however, produce more and better organized embryonic tissue.

Of the more than 28,000 turkey eggs Dr. Olsen has tested during the past few years, a number of poult have survived. Two of the fatherless birds have lived more than a month—one is alive at close to seven months and is "normal" except for crooked toes, and bad eyesight or improper nerve coordination.

The USDA studies of parthenogenesis are contributing important information in two research fields: The fundamentals of cell development and growth, and the problems of poultry fertility and hatchability often critical problems for the turkey farmer.

Science News Letter, November 9, 1957

VIROLOGY

Viruses May Cause Cancer

► FRAGMENTS of genetic material, riding piggy-back on viruses into normal cells, may be responsible for most human cancer.

This possibility has been raised at a Conference on Genetic Concept for the Origin of Cancer at the New York Academy of Sciences by Dr. Wendell M. Stanley, Nobel Laureate and director of the University of California Virus Laboratory.

Dr. Stanley acknowledged that no definitive proof has been found for the existence of human cancer viruses. Yet he maintains that "most, if not all, cancer, including cancer in man," is caused by viruses.

He pointed out that scientists have been able to produce certain types of cancer in animals for many years. The lack of known cancer viruses in man may only mean they have not been found, Dr. Stanley said, adding that during the last year or so dozens of new viruses have been discovered.

Finally, Dr. Stanley proposed a mechanism observed in studies of non-cancerous viruses, that might explain how a virus could cause cancer. The mechanism is called transduction.

What happens is that a piece of chromosome, a heredity-bearing chemical, hitches a ride on a virus. Both virus and chromo-

some fragment are similar chemically. When the virus enters a cell, the fragment becomes incorporated into the cell's genetic apparatus.

The fragment has the ability to change the cell radically. The cell may put out new kinds of enzymes, antigens and other chemicals. It may produce offspring cells that are different from the original—and possibly cancerous.

Dr. Stanley said this transduction mechanism would be expected to happen rarely. So rare an occurrence would it be that it could not be considered to be an infectious mechanism in the usual sense, and defenses probably could not be set up against it.

The existence of such a mechanism could explain why scientists so far have been unable definitely to link cancer with viruses in humans. He emphasized that the transduction idea is so far theoretical only.

Dr. Stanley indicated he believes that if more scientists assume viruses cause cancer, proof will be forthcoming. A virus explanation for cancer, he asserted, "represents by far the most intellectually satisfying working hypothesis which is consistent with all presently known facts."

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GEOPHYSICS

Dog Aboard Sputnik II

► THE MOST important aspect of the second Russian earth satellite—Muttik or Sputnik II—launched Nov. 3—is not that it is carrying a dog but that it seems to be of such large size, approximately half a ton. This probably is the combined weight of the last stage of the rocket and the satellite, which in the second Sputnik seem to have been combined.

This may or may not mean that there was used a more powerful rocket for the second than for the first satellite. In any event, the rocket, probably a modification of a military one, is adequate.

The satellites are steps toward a space platform, an artificial moon of the earth that could be used to view the earth by television, if not carry men. Not all the problems for such a venture are solved, by any means, because very accurate guiding of rockets will be necessary to put into orbits the various satellites that would be brought together to form one big one. This accurate guidance has not yet been achieved, in all probability.

A rocket to the moon becomes more plausible and imminent, although there are many who have been predicting a moon rocket, non-man carrying of course, ever since the first Russian satellite. Perhaps the moon rocket will be tried soon.

The dog passenger aboard Muttik will give the antivivisectionists something to worry about. Some fanatical lovers of dogs would rather see a man or a child take such a journey than a dog. How the dog

will be rescued from the satellite, if that is the Russian plan, will be watched with keen scientific interest. The coded teletyped information from Muttik, on 20 and 40 megacycles, reporting what is happening to the dog, can give science some important information about space travel. The signals can be picked up on amateur radio receivers.

The Russians have not revealed to other world scientists of the International Geophysical Year the information necessary to decipher the radio signals which report to earth what conditions are inside and outside of the new satellite. Until they do this they are not really playing the IGY game as we would wish they would.

The weight of the second satellite was announced by Moscow as 508.3 kilograms (1120.29 pounds) but this may not be comparable to the 184 pounds of the first satellite because it probably includes part of the rocket. Speed is announced as 17,840 miles per hour compared with 18,000 miles per hour for the first satellite, while the altitude of the orbit was said to be 932 miles compared with 560 miles. The comparative times of circling the earth are 103.7 minutes for the second satellite and 96.2 minutes for the first. The angle to the equator for the second satellite is 65 degrees, no direction given, compared with 65 degrees north to south. The size and shape of the second satellite were not announced by Moscow.

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AGRICULTURE

Test Kit Aids Research On All-Round Milk

► A LACTOMETER, or "milk measurer," developed by U. S. Department of Agriculture scientists, will soon provide researchers and farmers with a field instrument to measure the non-fat solids in milk.

Protein, lactose, casein, albumin, sugar and several minerals are the milk solids receiving increased consumer interest. The portable lactometer devised by USDA dairy chemist Paul D. Watson, with accessories designed by Fred M. Grant, may become the basis for breeding strains of dairy animals that produce milk with the greatest all-round food value.

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PHYSICS

Physicists Win Prize

The Nobel Prize in Physics for 1957 has been awarded to two scientists who suggested that one of physics' basic laws, conservation of parity, did not always hold good.

► THE REMARKABLE discovery last year for which the Chinese-born American physicists, Drs. T. D. Lee and C. N. Yang, were awarded this year's Nobel Prize in Physics is still being confirmed by scientists around the world. A year's interval is believed the shortest known time lapse between a discovery and the award of a Nobel Prize in Physics.

Drs. Lee and Yang proposed that the principle of "conservation of parity," held as one of the basic ideas of physics for nearly 30 years, did not hold good in certain types of radioactive disintegrations of atoms. Now scientists are finding the principle is also not true in other cases.

Dr. Yang is professor of physics at the Institute for Advanced Study, Princeton, N.J. Dr. Lee, a Columbia University physics professor, is on leave and also at the Institute, where he and Dr. Yang are doing further mathematical work directed at a better understanding of what goes on in atomic cores, or nuclei.

Drs. Lee and Yang suggested discarding the theory of "conservation of parity" in the *Physical Review* (Oct. 1956). Within four months after this report, scientists at the National Bureau of Standards, Columbia University and the University of Chicago confirmed with experimental evidence the fact the law did not work in the break-up of certain sub-atomic particles known as pi and mu mesons. (See SNL, Jan. 26, p. 51 and April 27, p. 258.)

Now there is evidence the law also does not apply in the disintegration of hyperons, heavy atomic particles.

Parity expresses the idea that the mirror image of a physical system follows exactly the same laws as the system itself. It is connected with the relationship between the direction of spin and the direction of motion of atomic particles.

The relationship can be either right-handed or left-handed, scientists now known. An example of right-handedness in this connection is the ordinary corkscrew that, when turned clockwise advances into a cork. However, some corkscrews are made so they advance into the cork only when turned in a counter-clockwise direction, illustrating left-handedness.

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CHEMISTRY

Nobel Studied Life Particles

► THE AWARD of the 1957 Nobel Prize in Chemistry to Sir Alexander R. Todd, Scottish-born professor of organic chemistry at the University of Cambridge, England, for "his work on nucleotides and nucleotide coenzymes" raises the question, "What are nucleotides?"

Sir Alexander himself explains the role of these fundamental life particles as follows:

When the complex nucleic acids found in all cells and tissues are broken down by the addition of water, "relatively simple compounds" called nucleotides are formed. They are phosphates of the "ribosides or 2-deoxy-ribosides of certain purine and pyrimidine derivatives."

Both nucleotides and nucleotide coenzymes have a structure consisting of one or more units. Each of these units is composed of a combination of sugar, phosphoric acid and a base.

The laboratory production of living matter is believed to be hinged on finding the specific structure of nucleic acids, the basic life substance.

It is known that the nucleic acids consist of many nucleoside residues linked together by phosphate groups. However, the positions of linkage, the sequence of residues and whether or not the acids have straight or branched chains are all problems that need to be solved.

Sir Alexander, in the annual Harvey Lectures delivered in 1951 under the auspices of the Harvey Society of New York said nucleic acids were so named because they were originally found in cell nuclei. They are now known to be normal constituents of all cells and tissues, and are associated with proteins as nucleoproteins.

The nucleotides have been much less extensively studied than either proteins or carbohydrates.

The plan that Sir Alexander used to learn about them involved attempting to synthesize the complex molecules.

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NOBELIST IN CHEMISTRY—Sir Alexander R. Todd, professor of organic chemistry at the University of Cambridge, England, received the Nobel Prize for his work with nucleotides and nucleotide coenzymes.



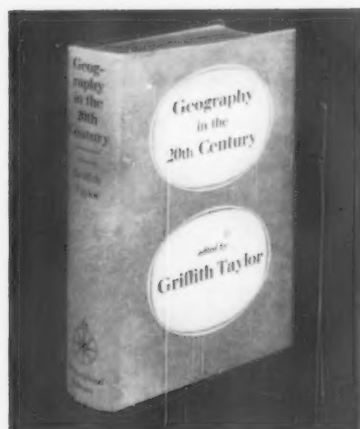
PHYSICS PRIZE WINNERS—Drs. T. D. Lee and C. N. Yang, both now at the Institute for Advanced Study, Princeton, N. J., were awarded the Nobel Prize in Physics for their work in disproving the principle of "conservation of parity."

● RADIO

November 16 and 23, 1957

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network will not be broadcast November 16 and 23, due to scheduled football game.

"Adventures in Science" will resume at its regular time Saturday, November 30. Check your local CBS station.



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INVENTION

Paper Made From Fungi

► A NEW SOURCE for the manufacture of paper and paper products, the filaments of fungi, has been proved feasible by four scientists at the Institute of Paper Chemistry, Appleton, Wis.

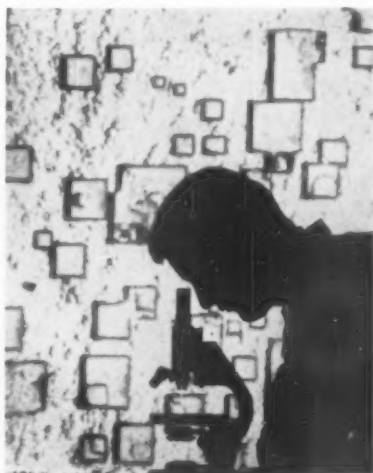
To understand clearly the importance of their invention, the fact that all today's paper and paper products are made from one primary division of the plant kingdom should be known. All life on earth is considered divided between the plant and animal kingdoms. Within the plant kingdom, there are two phyla, or primary divisions. One is known as Spermatophyta and the other as Thallophyta.

The Spermatophytes include the highest plants, or those that produce seeds, such as trees. It is from this division that present-day paper products are made.

The Thallophytes are a diverse group of plants that include the fungi, algae, bacteria, lichens and slime molds. Although the invention relates primarily to fungi, the other classes are included.

To make paper or paper products from fungi, the scientists use that part of the fungus known as the thallus, which, if it is filament- or thread-like in character, is known as the mycelium. Substantially pure filaments of fungi are prepared and disintegrated in much the same manner as in usual paper manufacture. The disintegrated fungi can then be suspended in water and made into a sheet.

Sheets of mycelia alone, the inventors report, tend to become brittle. However, the addition of as little as ten percent by weight of cellulose fibers gives sheets of paper with "much the same characteristics" as normal paper, although with somewhat less strength.



FOUR-WAY STEEL—Crystals of steel that can be magnetized in four directions are shown here in this photograph taken at the Westinghouse Research Laboratories, Pittsburgh, Pa.

When the mycelia sheet is subjected to heat or pressure, or both, a continuous film is formed that is both transparent and flexible. Paper sheets including the mycelia have high gloss and good printing characteristics, which make the mycelia valuable as a sizing agent.

The addition of mycelia to wood pulp, the inventors state, also makes possible the manufacture of paper and paper products having flame resistant properties.

For this development, the scientists were awarded patent number 2,811,442. The scientists are Willis M. Van Horn, Julian H. Conkey and Bernard F. Shema, Appleton, and William H. Shockley, Camas, Wash.

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GENERAL SCIENCE

Army Issues Want Ad For 200 Scientists

► THE U. S. ARMY wants 200 scientists to become regular army officers.

In a very attractive 35-page "want-ad," the Army has introduced its Project 200, described as a "unique program" for scientists and other advanced specialists offering "not only unlimited professional horizons but also outstanding personal rewards."

The Department of Defense campaign, said to be a "high-priority" project, is a recruitment drive for 200 outstanding civilian specialists in 20 critical fields.

"Since the work of men in Project 200 is of the most advanced nature," the Army says, "the qualifications for the project are naturally high."

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METALLURGY

New Kind of Steel Lets Magnetism Turn Corners

► A NEW KIND of steel that allows magnetism to go around corners has been developed.

The silicon and iron magnetic material, developed at Westinghouse Research Laboratories, Pittsburgh, Pa., is expected to simplify construction and improve performance of electrical equipment.

Dr. Clarence Zener, Westinghouse research director, called the steel a "major scientific breakthrough for the electrical industry." He attributed the successful climax of the 25-year search for such a material to the steel's crystal orientation that allows it to be magnetized in four directions simultaneously.

Steel now used in magnetic cores can be magnetized in two directions only, back and forth along the direction in which it was rolled by the manufacturer.

The Westinghouse research grew out of work originated by scientists of the Siemens-Halske Co., Hanau, Germany.

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TURBO-PROP AIRCRAFT—A new observation plane, the U.S. Army's first turbo-prop powered fixed-wing plane, has been built by the Grumman Aircraft Engineering Corporation. The AO-1 Mobauck is designed to operate from small, unimproved fields, water, snow and mud; a bubble canopy provides maximum visibility.

ASTRONAUTICS

New "Air" for Space Ship

Synthetic air, half helium and half oxygen, for the space traveler to breathe during his round trip adventure to the moon, has been proposed.

► SYNTHETIC "air" for the first space ship to circle the moon and return is proposed by John Gustavson of the University of California, Berkeley. The man-made atmosphere would be half helium and half oxygen kept at a relatively low pressure.

Providing an adequate air supply system and livable temperatures for a crew of four or five for at least ten days, Dr. Gustavson's studies show, is quite a problem. Today's pilots are getting a sample taste of what it is like to fly in space, but only for an hour or so at a time.

In the space vehicle of the future, the temperature must lie between 70 and 90 degrees Fahrenheit and the humidity must be stabilized at about 40%. Crew members will have to spend several days before departure adjusting themselves gradually to the helium-oxygen atmosphere.

"Hot spots" on space ships will make temperature control difficult. The sun's radiation will be the main source of heat. Some of this can be dissipated into space by treating the ship's surface facing the sun with a highly reflective material, while that away from the sun is given a coating that allows the heat to escape.

Other heat sources within a space ship are the electronic equipment, the crew itself, and cooking facilities and lighting.

The best way to remove this heat, Dr. Gustavson suggests, is through use of a heat exchanger. The heat would be absorbed by a chilled fluid, which would then be pumped through a radiator on the

dark side of the vehicle. This system will also permit easy removal of water vapor, which might condense in the heat exchanger.

Eliminating either toxic gases or those that could burn spontaneously, such as hydrogen and methane, is another problem. The carbon dioxide breathed out by crew members could be absorbed by lithium oxide pellets.

The usual proposal of using the tiny green water plants known as algae, which produce oxygen, to balance the carbon dioxide is of "doubtful" value. This system is only 25% efficient, providing the proper growth conditions is difficult and the algae are extremely temperature-sensitive. Most important, Dr. Gustavson says, some algae produce deadly carbon monoxide along with the oxygen.

His conclusions are reported in the publication of the American Rocket Society, *Astronautics* (Nov.).

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PHYSIOLOGY

Men Are Physically Able To Travel in Space Now

► MEN ARE physically capable of surviving space trips right now, says Dr. Nello Pace, University of California, authority on high altitude physiology. (See SNL, Oct. 19, p. 247.)

However, human ventures into space at

present would be marginal. The efficient use of human observers on missiles and space platforms for extended periods requires much more research on man and his relationship to his environment.

The scientist, who is operations director of the University's 14,250-foot-high White Mountain research station, pointed out that American achievements in conquering physiological problems of space are already considerable.

The Navy's Stratolab Project twice has put two men up to 80,000 feet for several hours, and the Air Force's Manhigh Project kept an observer at more than 100,000 feet for more than 24 hours.

"The conditions in space are not essentially different from those at 100,000 feet," Dr. Pace said.

He added that psychological stresses and problems of food and air supply in atomic submarines are almost identical with those encountered at high altitudes. These and other problems of extended submergence have been extensively studied.

Important problems remain to be solved, however, Dr. Pace said. One of the most important concerns the effects of gravitation. It has been found in rocket flights that animals become disoriented, and similar results have been found in humans in brief periods of weightlessness at certain points in the parabolas of diving aircraft.

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ASTRONAUTICS

Big Space Race: Rocket to Moon

► THE NEXT great space race between the United States and U.S.S.R. is: Who will be the first to get a rocket to the moon?

It is not so impossible as it may sound.

A velocity of seven miles per second at any altitude above the atmosphere will allow a rocket to escape into outer space. This means that it could hit the moon.

Already the Russian satellite has achieved five miles per second velocity. Only two more miles per second are needed.

The giant Far Side U.S.A. rocket that was fired from a high altitude balloon on Eniwetok Atoll Oct. 21 rose 2,750 miles in altitude and may have reached a height of 4,000 miles.

This U.S.A. rocket was expected to travel at about the velocity of the Russian satellite, five miles per second.

The gap between what has been achieved and the escape velocity is closing.

Perhaps from a propaganda standpoint, the U.S.A. should hit the moon first. How fast it could be done and what more it would cost beyond the present missile expenditures is a question.

Half a billion dollars might do it in a matter of months if the good old U.S.A. punch is put behind the project.

If a small payload were landed on the moon, consisting of a brilliant blue powder that would spread and mark the moon so that anyone with a field glass would know an earth-to-moon rocket were successful, it might neutralize the Russian accomplishment of sputnik.

Science News Letter, November 9, 1957

MEDICINE

Oral Insulin May Prevent Diabetes

► PREVENTING active diabetes from developing in people known to be susceptible to it may be possible with Orinase, the new insulin-replacing drug that can be taken by mouth.

A large-scale study of the drug as a preventive had been started by Dr. Riley Thomas, Howard University Medical School, Washington, on pre-diabetics who are not yet ill with the disorder but who may become active diabetics in the future.

These people are susceptible to diabetes because either one or both of their parents were diabetics and have passed on the hereditary weakness.

About 25% or 35% of them do become active diabetics sooner or later, Dr. Thomas told SCIENCE SERVICE.

Under normal conditions, their insulin production is adequate, but if they eat too much of sugar-containing foods, the excess sugar cannot be handled by the body and begins to show up in the urine.

As these "spill-overs" continue to occur, the body is able to produce less and less insulin and the person then becomes an active diabetic who requires insulin injections.

Diabetes-susceptible persons can be spotted by the use of the glucose tolerance test, in which injections of a sugar solution are given. If the pancreas is not able to supply the normal amount of insulin, excess sugar appears in the urine.

Orinase will probably be able to reverse the results of the glucose tolerance test in some of these individuals and will be given to them periodically, Dr. Thomas said.

The drug seems to revive the insulin-producing cells of the pancreas and enable them to produce more of the necessary insulin.

Follow-up studies done on these cases five, ten or more years from now will show whether the drug is effective in preventing active diabetes.

Science News Letter, November 9, 1957

METALLURGY

Mass Production of Man-Made Diamonds

► MAN-MADE diamonds, identical to the natural stones, will be in mass production for industrial users sometime next year, the General Electric Company's metallurgical products department has revealed. More than 100,000 carats of diamonds already have been produced in pilot plant operations, Kenneth R. Beardslee, general manager of the department, said.

Synthetic production of industrial grade diamonds is expected to free the United States from dependence on Belgian Congo and South African supplies, Mr. Beardslee said.

Diamonds produced in quantity at the GE laboratory have been shown to be identical to natural diamonds on the basis of optical, X-ray and chemical examinations and hardness tests, the company revealed.

The largest of the synthetic diamonds are about the size of coarse grains of sand, and most of them are about the size of fine sand.

The man-made diamonds, produced from carbon under high pressure and high temperature in a duplication of the natural process, will be used in cutting tools grinding wheels and other industrial equipment.

The present cost of the ungraded diamonds is \$4.25 a carat, about 40% higher than the cost of ungraded natural diamonds, John D. Kennedy, manager of the diamond section, said. He added that expanded production facilities are expected to bring the cost down.

General Electric scientists emphasize that the man-made diamonds are not imitations, but are the same diamonds nature produces except for size. Further research is expected to increase the size.

The synthetic diamonds are said to demonstrate all the variations of color, clarity and crystallinity found in naturally occurring diamonds.

Science News Letter, November 9, 1957

TECHNOLOGY

Foresees Windows That Light Up the Home

► SCIENTISTS at Westinghouse's Bloomfield, N. J., laboratory believe they will be able to produce daylight in the average home 24 hours a day with a product called electroluminescent windows.

The windows, a future step in the development of panels and murals that glow and give off light, will mean that a housewife can turn to her husband and say "Dear, it's getting dark, please turn on the windows."

According to Edward G. F. Arnott, director of research at the Westinghouse lamp division, the transparent windows will have to wait until the 1960's before their general use becomes practical.

By then, however, the process by which windows can be made to give off enough light to illuminate a home should be perfected.

Using electroluminescence, scientists have been able to coat sheets of glass with phosphors, capable of producing light. In this manner, they have already produced, for commercial use, electroluminescent panels and murals.

Now, they are experimenting with transparent phosphors that will enable them to sandwich a phosphor between two sheets of glass having an electrical conducting coating.

"During the day," Mr. Arnott says, "this glass would allow the daylight to come through and permit the viewer to look out, or in, in the customary manner. At night, however, electricity would be applied and the transparent phosphor would emit light."

Chameleon-like, or color-changing panels, no thicker than window glass, can be used to line and light an entire wall or ceiling, and give off light equivalent to that in a modern well-lighted office.

Science News Letter, November 9, 1957

IN SCIENCE

EDUCATION

College Scholarships Double in Five Years

► COLLEGE STUDENTS now have about twice as many scholarships to try for as they had five years ago, the U. S. Department of Health, Education and Welfare reports.

In 1955-56 there were 237,000 scholarships available at U. S. colleges and universities, valued at \$65,700,000. Five years before there was only \$27,000,000 available.

Altogether, scholarships, loans and campus employment available to college students amounted to more than \$144,000,000 in 1955-56.

Results of the survey, which is intended to help parents, young people and educators know where to find financial aid, are reported in two publications, "Financial Aid for College Students: Undergraduate," and "Financial Aid for College Students: Graduate." Copies may be obtained from the Superintendent of Documents, U. S. Government Printing Office, at \$1.00 and 50 cents respectively.

Science News Letter, November 9, 1957

NUTRITION

Chewing Not Needed By Peanut Eaters

► A STUDY of salted-peanut eaters has shown that as many nuts are digested after very poor chewing as are digested after thorough grinding between teeth.

This and other studies have led nutritionists to believe that swallowing food without chewing it does not wreck the digestion as was once thought, it is reported in *Nutrition Reviews* (Oct.).

Fifty years ago, chewing and more chewing was considered essential. One nutritionist, Horace Fletcher, and his many followers believed that everything had to be chewed at least 32 times. The British Prime Minister Gladstone even attributed his success in life to the fact that he gave "every tooth a chance" and applied 32 bites to every mouthful.

Recent experiments on chewing and digestion have centered around the use of the "mesh bag." This is a tiny bag which contains either chewed or unchewed food, with small ball bearings added to tell one from another.

The bags are swallowed, allowed to pass through the digestive system, and then recovered. The amount of undigested residue is then measured to see whether the chewing did any good.

Some foods, including meats, digested just as well no matter what kind of chewing they got, while others, especially fried and roasted meats, did better with chewing.

Science News Letter, November 9, 1957

CE FIELDS

MEDICINE

"Smell Scale" Being Devised by Psychologist

► A "SMELL SCALE" is being devised by a University of California scientist.

Dr. F. Nowell Jones, professor of psychology at UCLA, believes our ability to smell can be measured as precisely as the ability to see and hear.

Subjects are asked to sniff a substance in a bottle at a given vapor pressure which was established as standard. Then as the amounts of the substance were varied, the subject was asked to make a subjective judgment as to the intensity of the odor.

These judgments were then compared to vapor pressures, or relative numbers of molecules, in the bottles. There was a close correlation between these judgments and physical measurements of vapor pressures.

From such data may come the means of regulating odors that are ventilation problems. Such a "smell scale" would indicate how much the physical intensity of an odor must be reduced to cut subjective odor below the unpleasant level.

This information might also be valuable to the food industry since taste is largely a function of smell, Dr. Jones notes. It could tell how much of a particular substance was needed to enhance the taste of a particular product.

What about "smelling aids" for the aged?

There is some indication that many old folks lose much of their sense of smell and appreciation for food just as their sight and hearing deteriorate. Dr. Jones thinks such a gadget might be possible but is probably not practical.

Science News Letter, November 9, 1957

MEDICINE

Doctors Alerted to Wandering Patients

► DOCTORS have been alerted to watch for a strange type of wandering patient who fakes startling symptoms to gain admission to one hospital after another.

A typical case of the so-called Munchausen's syndrome is described by Dr. John S. Chapman of the State University of Iowa College of Medicine, Iowa City, in the *Journal of the American Medical Association* (Oct. 26).

The patient was a 39-year-old merchant seaman and part-time professional wrestler who would burst into hospitals with blood splattered all over the front of his shirt, claiming to be in anguish from the pain in the left side of his chest.

None of the hospital's diagnostic studies showed a cause for the bleeding which, in Dr. Chapman's opinion, was faked and was produced by a variety of methods. The hospital staff, however, never found out exactly how the seaman did it.

The patient has been in at least 25 hospitals since 1943 and followed much the same pattern in all of them. He left unpaid bills amounting to about \$2,000 at each of six or more hospitals.

This is the first reported American case of Munchausen's syndrome although the condition has been reported frequently in England, Dr. Chapman says.

The name was first applied, somewhat jokingly, by an English physician in 1951 because the wide travels and fanciful histories of these patients reminded him of the travels and adventures of fiction's Baron Munchausen.

Such patients may obtain pathological enjoyment from the dramatic role of the patient, or they may harbor a grudge against the medical profession and resort to this to get even. But if this is so, Dr. Chapman says, they have an innate trust of doctors since they allow surgical operations and other dangerous procedures to be performed.

However, by the time the Munchausen-type pattern has been established, the patient is a candidate for a mental institution, even if he has a true organic disease to explain his symptoms, the scientist concludes.

Science News Letter, November 9, 1957

PUBLIC HEALTH

New Test Spots Syphilis Fast

► A FAST TEST for spotting cases of syphilis within minutes after a blood sample is taken was reported by Public Health Service scientists in *Public Health Reports* (Sept.).

The new test, called the Rapid Plasma Reagin Test, promises to be most useful for on-the-spot venereal disease testing of such groups as migrant workers, immigrants and industrial groups.

With present tests, migrant workers have disappeared many times before the reports got back from the laboratory.

The main difference between the new test and older ones is that it uses blood plasma instead of blood serum.

Plasma can be obtained by merely spinning the blood sample in a centrifuge and then pouring off the plasma from the top. To get serum, however, the sample must be allowed to clot before the serum can be separated.

For the new plasma test, about two thimblefuls of blood are collected, spun, and then separated into whole blood and plasma. To the plasma is added a special antigen solution and then any reaction between the two is watched for under a microscope.

If the mixture begins to clump, the reaction is positive and the subject has syphilis.

The new test is even more sensitive than the commonly used VDRL or Venereal Disease Research Laboratory one, and it is just as specific for syphilis.

Authors of the report are Drs. Joseph Portnoy and Warfield Garson, Venereal Disease Experimental Laboratory, Chapel Hill, N. C., and Dr. C. A. Smith, Communicable Disease Center, Atlanta, Ga.

Science News Letter, November 9, 1957

MEDICINE

Knock-Knees in Children Are Usually Outgrown

► KNOCK-KNEES are very common among toddling infants but are usually outgrown and should not cause parents unnecessary concern, Dr. A. J. M. Morley of the Institute of Orthopaedics, London, reports in the *British Medical Journal* (Oct. 26).

Fortunately, knock-knees usually improve without treatment. Except for surgery, there is no effective treatment known for the condition, he says.

More than 1,000 examinations of normal children were made and revealed knock-knees in 22% of those between the ages of three and three and a half. At the seven-year level, however, only one to two percent of them still had the same amount of "knock."

The knock-knees were not related to flat feet, the age at which the child started to walk, the duration of breast feeding, or the amount of vitamin supplements the child received in the first 18 months, Dr. Morley reports.

But there was a weight relationship, with knock-kneed children being somewhat heavier, on the average, than normal children.

Knock-knees in children under seven can probably be safely ignored unless the abnormality is excessive or there is some underlying cause for it, such as rickets or a broken bone.

An underlying cause should be suspected if the knock-knee is of unequal amount in the two legs, the child is short for his age, or if there is a family history of severe knock-knee or other bone deformity, Dr. Morley advises.

Science News Letter, November 9, 1957

ENDOCRINOLOGY

Estrogenic Hormone Found in Clover

► "COUMESTROL," a new potentially valuable estrogenic hormone, has been isolated from clover, the U.S. Department of Agriculture has reported.

The hormone, a crystalline substance found in Ladino clover, is also present in alfalfa and strawberry clover. Although it is considerably less powerful in its effects on animals than the synthetic estrogen stilbestrol, coumestrol is reported to be much more active than other plant estrogens.

Estrogens, which regulate specific growth and reproductive activities, can have either good or bad effects on animals. Stilbestrol is used to promote faster weight gains in beef cattle and in poultry. However, too much feed with estrogenic activity may cause a decrease in animal fertility, USDA scientists report.

Synthetic estrogens are also valuable in human medicine.

The new hormone was discovered at the USDA's Western Research and Development Division, Albany, Calif.

Science News Letter, November 9, 1957

ENGINEERING

Engines of the Future

The engines of the future will use new operating principles such as free pistons that "float" in their cylinders, and small engines will lift "flying cars."

By EDWARD HEDRICK

► **ENGINES** of the future are in for some big changes in design and operation. They will be lighter, smaller and more powerful.

They will make use of power sources such as "free" pistons that "float" back and forth in the cylinders, unhampered by connecting rods, with the exhaust gases doing all the work of turning a turbine.

Jet engine gas turbines will be harnessed for their power, and there will be "flying engines" or ducted fans to lift flying vehicles. Even nuclear and solar engines are being studied for ways to make them economically practical power sources.

Possibly the most promising power plant now under study is the "free-piston turbine" engine.

Ordinary internal combustion engines, such as the gasoline and diesel, transform the energy of an exploding fuel-air mixture into mechanical energy through the piston and connecting rod attached to the crankshaft. These conventional engines are usually "V" or "I" shaped, and the whirling crankshaft tends to set up twisting forces on the engine frame, requiring heavy, bulky supports to maintain stability.

The free-piston engine eliminates the connecting rods and twist by allowing the pistons to move freely away from the combustion chamber in opposite directions while the expanding exhaust gases help run a high-speed turbine wheel. The turbine in turn transfers the engine's power to the desired point.

The pistons are cushioned by a layer of air trapped in the rear of their cylinders, and so are "bounced" back toward the combustion chamber again for another engine cycle. The free-piston portion of the engine is called the "gasifier," since it produces the compressed gases used to run the turbine.

Any number of such gasifiers can be connected to one large turbine to increase the power of a single engine. A gasifier can be serviced or repaired while the turbine is running, in this arrangement.

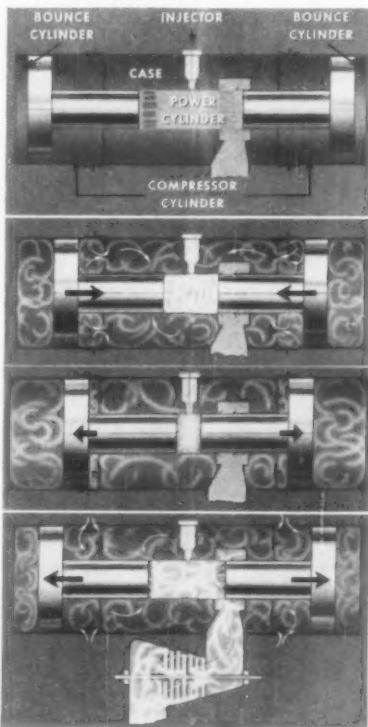
Peanut Oil Burner

A new type of free-piston engine has already been built into a farm tractor by the Ford Motor Company. The motor burns almost any kind of fuel, from high octane gas and diesel oil to peanut oil and some vegetable oils.

It is light in weight, small and compact in volume, and requires no critical or "exotic" metals in its manufacture. At idling speeds the turbine's whine can be heard, but otherwise the noise level is low.

At the present stage of development, there are a few "bugs" that must be worked out of the engine. It is a little too heavy, three pounds per horsepower, to compete with other engines; it is sometimes hard to start and the turbine speeds are too low to provide the high operating speeds industry requires.

When these problems are solved, however, this type of engine is expected to compete



FREE-PISTON ENGINE — The operating sequence for the inward-compression free piston engine is shown in this series of drawings. Beginning at the top, with the pistons in starting position and all valves closed, the next steps include: starting air pressure admitted to bounce cylinders, pistons moving inward thus closing ports and compressing air; pistons complete their inward travel, fuel is injected into the power cylinder, combustion starts and power stroke begins; and, further outward movement of pistons opens intake ports, completing the power stroke.

in design as well as cost with conventional engines.

As an example of the free piston engine's progress in the automotive industry, the General Motors Corporation is now experimenting with a futuristic-looking free-piston-powered car called the "XP-500."

The gas turbine of jet plane fame is also under study as a future power source for industry and automobiles.

The motor has several advantages over conventional engines; it does not need a "warm-up" time, requiring only a spark to start the fuel burning and the turbine turning. It can be made as compact as present engines, runs much more quietly and smoothly and has a cleaner exhaust. Its servicing is simple as it has only one moving part: the turbine. Other parts are as easily serviced as present engine components.

Harnessing the Jet

The gas turbine's speed, power, apparent efficiency, smoothness and lack of noise were attractive to designers, but in studying the engine they ran into some difficulties. The major one was relative size or scaling: they could not build a tiny turbo-jet engine and simply attach it to a machine or car.

Jet planes making use of turbo-jet engines are propelled by hot, expanding gases shot from the nozzle of the jet, while ground machines must be driven by a wheel powered by a "harnessed" jet. This harnessing required many design changes, for example, the development of small-sized turbine wheels that had to operate at temperatures of approximately 1,200 degrees Fahrenheit.

Turbine wheels had to be made of special, expensive, high-temperature metals, the larger ones had to be especially cooled, and engine efficiency increased by heat exchangers. All these design features added up to extra bulk, weight and expense of the turbine engine.

These disadvantages are rapidly yielding to designers as, for example, in the General Motors "Firebird" experimental turbo-car, the Chrysler experimental gas turbine Plymouth and the gas turbines now under development for use in future buses, locomotives, electrical generators and ships.

The gas turbine may be the means to change the energy from the splitting atom or the sun into usable power. Both the fissioning atom and the sun give off heat. The gas turbine seems to be the most efficient way of making this heat turn the wheels of industry or producing electric power for cities and communities, designers say.

Nuclear gas turbine power plants for ships, submarines and power stations are now being studied and planned. Present nuclear reactor power sources are not built with gas turbines. They make use of a heat exchanger to make steam for steam turbines.

In the future, nuclear power plants for propelling merchant ships may be the main

source of marine power in 10 to 15 years, predicts C.G.A. Rosen of the Caterpillar Tractor Company. Nuclear power for military but not for commercial aircraft is within the "foreseeable future," but he considers the outlook dim for nuclear-powered locomotives and vehicles.

The combination of gas turbine and nuclear power is not expected to be used for cars or military automotive equipment, mostly because of its weight. A nuclear power plant would be saddled with about 20 pounds of reactor shielding per horsepower and this does not include the weight of the engine.

Solar-powered vehicles are still too far in the future to make definite predictions, but designers admit that use of the vast amount of solar energy falling on the earth is not impossible. In the geographical area of the U.S. alone, as much as 2,000 times the daily energy needs of the U. S. falls as solar energy.

Flying Station Wagons

Future cars, buses and lifting equipment may operate in the air, not on the ground, if the "aerial jeep" under development for the Army Transportation Corps becomes available to the public.

The flying cars make use of "ducted fans" to lift them smoothly and easily into the air. Ducted fans are simply propellers with wings wrapped around them. They look like "flying barrels." The prop blast is directed downward, making it possible to lift heavy objects directly, as a helicopter does.

The aerial vehicles are expected to look much like regular cars, but be flatter and wider to accommodate two to four ducted fans located in conventional tire positions. The vehicles, being designed for the Army as personnel carriers, flying gun and observation platforms, flying cranes and rescue cars, are expected to be able to lift 1,000 pounds as high as a helicopter could and travel at speeds of 50 to 60 miles an hour.

One manufacturer, among the four contracted by the Army to develop the "aerial jeep," envisions the future civilian use of the vehicle as the "station-wagon of the future."

The old reliable conventional piston engines are also in for some improvement.

Fuel Injection Predicted

Fuel injection is becoming more popular with manufacturers as better designs make the system more dependable for gasoline-type engines.

While diesel engines rely upon a type of fuel injection as part of their construction, gasoline engines must be especially fitted for fuel injection. The reason is they were originally designed to have the fuel-air mixture from the carburetor sucked into the cylinder by the action of the piston, not forced in as a pressurized, pre-mixed spray, as in the fuel injection system.

Fuel injection is expected to make gasoline engines more powerful for their size and more efficient. The carburetor is not needed, and the engine can be started cold.

Fuels for the combustion engines of the future may have to pack more power in a smaller volume. For conventional piston-type engines, gasoline is expected to be refined up to 110 octane by 1960.

Some buses and trucks are already running on a fuel called "LPG" or liquefied propane gas.

Fuel-grade propane gas is a mixture of hydrocarbons, similar to natural gas. Propane gas is commonly found as the pressurized fuel gas in small hand blowtorches used for soldering purposes.

When liquefied, propane gas can be a highly efficient fuel if it is burned in properly modified internal-combustion engines. The gas burns clean with an almost invisible, odorless exhaust, forms very little engine deposit and does not burn the oil film on the cylinder walls.

Using LPG also saves considerable money. One bus company fueling their vehicles with the gas reports a savings of about \$2,000 in fuel and upkeep on each bus.

Making use of better fuels, small size, better efficiency and light weight, industrial power plants of the future will be better fitted to deliver power efficiently and cheaply, with the minimum of maintenance.

Science News Letter, November 9, 1957

A series of *stalactites* in the Luray Caverns of Virginia has been "tuned" by grinding away portions of the surface so that they produce organlike music when struck with rubber-tipped hammers.

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MEDICINE

Backaches Come From Unsolved Problems

► BACKACHES are mostly caused by failing to come to terms with everyday emotional problems, Dr. T. H. Holmes, University of Washington, Seattle, told the Academy of Psychosomatic Medicine meeting in Chicago.

Controlled tests have shown that too much muscle function and electrical activity usually accompany low back pain, and the pain is always set off after the patient's security has been threatened.

Backache is a reaction that sets in when a person tries to solve a "life situation" and does not succeed, the psychiatrist reported.

Chief causes of these insecurity feelings include conflict, anxiety, frustration, humiliation and guilt. The pain they cause may show up in the back, neck or extremities when these interpersonal and social reactions are not properly dealt with.

Available evidence points to the fact that the element potassium is the pain factor in backache. When intense muscle activity continues there is a gradual accumulation of the chemical in the tissues. After the concentration has become high enough, the pain threshold is exceeded and the result is a common backache.

Science News Letter, November 9, 1957

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE AGE OF PSYCHOLOGY—Ernest Havemann—Simon & Schuster, 115 p., paper \$1.00, cloth \$3.50. A book about the popularity of psychology by a writer who trained as a psychologist.

APPLIED OPTICS AND OPTICAL DESIGN—A. E. Conrady—Dover, 518 p., illus., paper, \$2.95. Devoted to the development of general methods for the solution of optical problems.

BASIC RESEARCH: A National Resource—National Science Foundation—Gort. Printing Office, 64 p., paper, 45 cents. There are few subjects, the foreword points out, so deeply related to our present and future vitality and strength as a nation as is basic research in science. (See p. 291.)

BETTER BIOLOGY FOR HIGH SCHOOL—D. K. Gillespie—Vantage, 235 p., illus., \$3.50. A syllabus-text for high-school teachers intended to satisfy a pupil's craving for facts. Presenting study material not ordinarily found in current high-school biology texts.

BIOLOGICAL ASPECTS OF THE TRANSMISSION OF DISEASE—C. Horton-Smith, Ed.—Hafner Pub. Co., for Institute of Biology, 184 p., \$4.00. Based on a symposium intended to break down specialist barriers that have hindered exchanges of views among workers in allied biological fields.

THE BIOLOGY OF AGEING—W. B. Yapp and G. H. Bourne, Eds.—Hafner Pub. Co., Symposia of the Institute of Biology No. 6, 128 p., \$4.25. Discussing the characteristics of growing old in animals, plants, and even bacteria, as well as man, and the chances for delaying the process.

THE CENTURY OF THE SURGEON—Jürgen Thorwald—Pantheon Books, 432 p., illus., \$5.95. Telling of the great advances made by surgery during the lifetime of one man.

CLUES TO SUICIDE—Edwin S. Shneidman and Norman L. Farberow, Eds., foreword by Karl A. Menninger—McGraw-Hill, 227 p., \$5.50. Some 16,000 persons in the U. S. take their own lives in a year. Many of these suicides might have been prevented.

A COMPARISON OF THE DEVELOPMENT OF ORAL AND WRITTEN LANGUAGE IN SCHOOL-AGE CHILDREN—Lester E. Hartell, Jr.—Child Development Publications, 77 p., paper, \$2.50. We know much more about the writing of children than of their oral composition and the relationship between this and writing.

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS—N. Irving Sax and others—Reinhold, revised and enlarged ed. of Handbook of Dangerous Materials, 1467 p., \$22.50. This new edition lists over 8,500 materials with encyclopedic information on the hazards.

DRUGS AND THE MIND—Robert S. de Ropp, foreword by Nathan S. Kline—St. Martin's, 310 p., \$4.50. The story of the new and ancient drugs—from Marihuana to "Miltown"—their effect on the brain and emotions, their potentialities for good and evil.

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Science News Letter, November 9, 1957

Questions

ASTRONAUTICS—How do scientists propose to solve the problem of "hot spots" on space ships? p. 295.

BIOLOGY—What effect does fowl pox vaccination appear to have on a hen's ability to produce spontaneous embryos? p. 291.

MEDICINE—What is the "Munchausen's syndrome"? p. 297.

Photographs: Cover, U.S. Department of Agriculture; p. 291, U.S. Naval Ordnance Laboratory; left, Columbia University, right, United Press Telephoto; p. 294, Westinghouse Electric Corporation; p. 295, Grumman Aircraft Engineering Corp.; p. 298, General Motors Corp.; p. 304, Ruby Barnhard.

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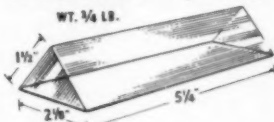
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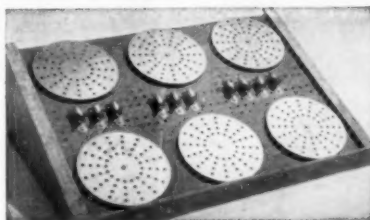
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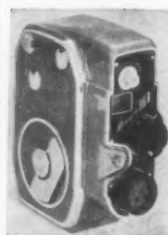
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Science News Letter, November 9, 1957

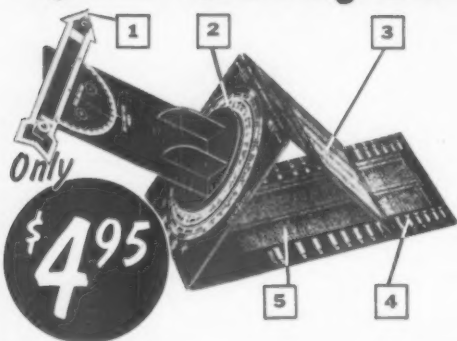
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The boon of lanthanum

Our former research vice president, Dr. C. E. Kenneth Mees, one of a few men who shortly before World War I conceived the novel idea that science had a place in industry, has suggested to us from his retirement in Honolulu that the public ought to be told more about rare element glass. He is right.

Before photography itself was invented, a way was found to overcome the fact that a lens is stronger for blue light than for red. Combine a positive lens with a weaker negative lens and make the latter out of a glass which has more dispersion, i.e. rate of change of index with wavelength. The net result will still be positive power, but the negative element will lengthen the focus more for the wavelengths where the positive element is cutting it too short. This is called color correction and works fine.

Besides chromatism, nature and the laws of mathematics impose other impediments on man's strivings for perfect optical imagery. Each surface in a system contributes its own load of these aberrations, both plus and minus. The art of lens design consists of playing them off against each other. The more surfaces, the better the attainable correction. Another truism in the business has it that the deeper the curve, the bigger its load of aberrations.

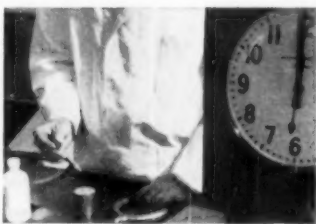
Very well. Along about 1934, as a result of some rather deep studies in glass chemistry, we found that by replacing certain traditional glass ingredients with such oddities as lanthanum oxide, one could make a glass of very high index but with a dispersion low enough for use in positive elements. The higher the index, the shallower the curves can be and therefore the lighter the load of aberrations to be balanced out. Before long, Kodak lenses demanding the best possible performance were being put out with elements of such glass, regardless of the cost of lanthanum and of 10-

pound batch production in pure platinum crucibles.

As the years rolled by, a new philosophy on using our rare element glass took shape among our lens designers. It goes like this: Shallow curves not only introduce less aberration, but geometry permits more of them on a single block for grinding and polishing. This economy can pay for a pretty high glass cost. At the same time, the customer gets a level of aberration correction superior to what the same number of components could have bought him before lanthanum.

Doctor Mees and we hope that when next you shop for a personal camera, you give particular consideration to the Kodak Pony 135, the Kodak Pony IV, the Kodak Signet 30, 40, and 50 Cameras, and the fixed f/1.9 lens of the Kodak Medallion 8 Movie Camera. They've got it. Lanthanum, that is.

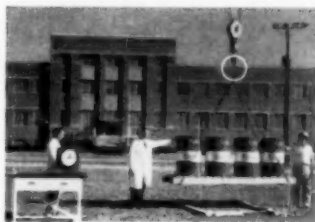
It polymerizes



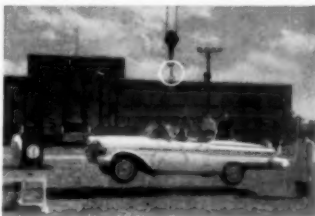
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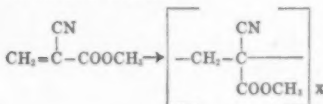


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❁ **PARKING METER REMINDER** is designed like a man's wrist watch and has a clock-like hand indicating the expiration of parking time. It also serves as a coin holder for eight nickels or dimes. The plastic holder and timer weighs one ounce.

Science News Letter, November 9, 1957

❁ **HOBBY CHEST** is said to contain every craft tool a beginning or experienced craftsman needs. Together with a full line of cutting knives, the kit has a hand drill, vise, block plane, sander, spoke-shave, hammer and other tools. It is housed in a wood chest.

Science News Letter, November 9, 1957

❁ **CAR BAG** for preventing littering of the highways is a heavy duty canvas caddy. The 11-inch-high sack is mounted on a frame that hooks on to the back of any front seat. Water-repellent and mildew-resistant, the bag is five inches wide and seven inches long.

Science News Letter, November 9, 1957

❁ **KITCHEN CUTLERY** features handles designed to fit a woman's hand. The black wooden handles, shown in the photograph, are impervious to heat and acids. Flat-ground knife blades can be resharpened by



any conventional knife sharpener. The knives are said to do away with the old heavy butchering type knives.

Science News Letter, November 9, 1957

❁ **NAME PLATES** for toys keep junior's playthings identifiable. Made of highly polished brass, they are applied with self-adhesive backing. First names in century

type letters are engraved on the plates which are one-half inch by one inch.

Science News Letter, November 9, 1957

❁ **BICYCLE RADIO** can be mounted on the handle bars of a bicycle, motorbike or motorcycle. A German development, the radio looks like a bicycle light. Powered by a small anode battery, the radio has a range of from 520 to 1620 kilocycles.

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❁ **ROLLING DOOR** of aluminum and insulating glass is designed for economical maintenance. The door for patios and terraces can be adjusted with a screwdriver. It rides on nylon wheels encasing steel ball bearings and is weatherstripped in vinyl plastic, wool pile and polyethylene. The door is available in five widths from 6 to 16 feet.

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❁ **SLIDE VIEWER** can handle up to 20 slides of 35 mm size at once. A desk-top unit, it measures eight inches high, eight inches deep and 12 inches wide. The screen is made of a translucent acrylic plastic formed with a series of narrow shelves to hold slides or negatives.

Science News Letter, November 9, 1957



Nature Ramblings



By HORACE LOFTIN

➤ THERE is nothing "homier" than a herd of Jersey or Guernsey cows grazing contentedly on a rolling pasture. On the other hand, the sight of flap-eared, wide-horned, high-humped Brahma or Sindhi cattle lolling on a flat, sunbaked prairie seems to sum up pictures of the exotic.

Historically, the Jerseys, Guernseys and most of the other familiar breeds had their origins in north Europe, where coolness of climate was typical. Transplanted to America, these breeds have done well over the temperate states. However, in the subtropical regions of the country, bordering the Gulf of Mexico mainly, these northern cattle do not perform so well in milk or meat production.

In recent years large numbers of the Brahma and Sindhi, both Zebu-type cattle, have been imported and bred in this subtropical region of the United States. Now these languorous beasts can be seen in herds all through the Gulf area, grazing and

Beating the Heat



fattening on land once fit only for rattlesnakes and alligators.

These odd-looking, exotic cattle from Asia are well adapted for life in tropic temperatures, which accounts for their great value in the South today. Yet it remains something of a scientific mystery just how these "Zebu" cattle keep cool.

It was once commonly thought that the flapping ears, the hump on his back and the loose-hanging dewlap of skin beneath his

throat accounted for much of the Zebu's heat resistance.

While scientists thought the hump contained special structures for temperature management, the other structures were believed to increase surface area for perspiration.

Putting theory to test, U. S. Department of Agriculture scientists removed the dewlap from a purebred Sindhi bull by surgery. No change could be noted in the animal's ability to withstand heat.

They also dissected the hump of a slaughtered Sindhi and found nothing more interesting than a well-marbled boneless chunk of meat. No heat control was apparent here.

Neither has evidence been found yet that the big ears help much—even as fans!

Whatever the Zebu's mechanism for beating the heat, it can be transferred at least in part to hybrid young. Crosses have been made between Zebus and northern breeds, resulting in animals that show good beef production in the hottest climate.

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